

**SITE ASSESSMENT REPORT
FOR
SANDOVAL ZINC RESIDENTIAL SITE
SANDOVAL, MARION COUNTY, ILLINOIS**

Prepared for:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Emergency Response Branch
Region V
77 West Jackson Boulevard
Chicago, IL 60604-3507

Prepared by:

WESTON SOLUTIONS, INC.
750 East Bunker Court, Suite 500
Vernon Hills, IL 60061

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WESTON START Project Manager	Tonya Balla
Telephone No.	847-918-4094
U.S. EPA On-Scene Coordinator	Kevin Turner

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January 6, 2010

Prepared by:  for Date: 1/6/10
Tom Binz
WESTON START Member


Reviewed by:  Date: 1/6/10
Tonya Balla
WESTON START Project Manager

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LIST OF ABBREVIATIONS AND ACRONYMS

°F	Degree Fahrenheit
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	Below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	<i>Code of Federal Regulations</i>
FIELDS	Field Environmental Design Support
ID	Identification
IEPA	Illinois Environmental Protection Agency
mg/kg	Milligram per kilogram
mg/L	Milligram per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OSC	On-Scene Coordinator
ppm	Part per million
RCRA	Resource Conservation Recovery Act
ROW	Right-of-way
RSL	Regional Screening Level
START	Superfund Technical Assessment and Response Team
TACO	Tiered Approach to Corrective Action Objectives
TCLP	Toxicity Characteristic Leaching Procedure
TDD	Technical Direction Document
U.S. EPA	U.S. Environmental Protection Agency
WESTON	Weston Solutions, Inc.
XRF	X-ray fluorescence

1. INTRODUCTION

The U.S. Environmental Protection Agency (U.S. EPA) tasked the Weston Solutions, Inc. (WESTON®), Superfund Technical Assessment and Response Team (START) to assist U.S. EPA On-Scene Coordinator (OSC) Kevin Turner in performing a site assessment at the Sandoval Zinc Residential site in Sandoval, Marion County, Illinois (the Site; **Figure 1-1**). Under Technical Direction Document (TDD) No. S05-0001-1027-001, U.S. EPA requested that WESTON START document current Site conditions; collect x-ray fluorescence (XRF) screening data in order to select soil sampling locations using a high-biased sampling approach; collect soil samples; obtain photographic documentation of Site conditions and site assessment activities; and evaluate the potential for imminent and substantial threats to human health, human welfare, and the environment posed by Site-related conditions. From August 23 through 25, 2010, WESTON START members Tom Binz and Mike Thierry conducted the site assessment under the direction of OSC Turner. The U.S. EPA Field Environmental Design Support (FIELDS) Team and Illinois Environmental Protection Agency (IEPA) representative Dave Jansen were also present at the Site during the site assessment.

This site assessment report is organized into the following sections:

- **Introduction** – Provides a brief description of the objective and scope of site assessment activities
- **Site Background** – Details the Site description and its known history
- **Site Assessment Activities** – Discusses XRF soil screening and soil sampling methods and procedures used during the site assessment
- **Analytical Results** – Discusses XRF screening and soil sample analytical results for samples collected during the site assessment
- **Threats to Human Health and the Environment** – Identifies Site-related conditions that may warrant a removal action under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP)
- **Conclusions** – Summarizes the site assessment findings

2. SITE BACKGROUND

This section discusses the site description and history.

2.1 SITE DESCRIPTION

The Former Sandoval Zinc Smelter is located at the far eastern end of East Mississippi Avenue in Sandoval, Marion County, Illinois (**Figure 1-1**). The Former Sandoval Zinc Smelter site encompasses 14.16 acres and is bordered by the CSX Railroad right-of-way (ROW) to the north and by undeveloped land to the east, south, and west. The coordinates of the Former Sandoval Zinc Smelter site are 38.6126617° North latitude and -89.1118827° West longitude. However, at the direction of OSC Turner, no sampling activities were conducted at the Former Sandoval Zinc Smelter site. This site assessment was specifically designed to sample residential properties located in the City of Sandoval. The purpose of the site assessment was to determine if process wastes from the Former Sandoval Zinc Smelter site were deposited onto these residential properties.

2.2 SITE HISTORY

The Former Sandoval Zinc Smelter site began operating as a primary zinc smelter in 1898. In 1915, the smelter began operating as a secondary zinc smelter until 1985.

In 1986, the Sandoval Zinc Company was officially dissolved and the owners declared bankruptcy. The property that once contained the smelting facility is now under private ownership. Wastes produced at the zinc smelting facility included cinders and ash containing metals. According the IEPA, waste cinder deposits at the smelter site are 1 to 10 feet thick. Cinders not used at the smelter site were placed in large piles and offered to the public and the City of Sandoval for constructing and surfacing roadways, driveways, sidewalks, and parking lots or for general fill purposes. IEPA indicated that the distribution of the cinder material is random throughout the City of Sandoval.

In October 2009, IEPA's Office of Site Evaluation conducted a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) expanded site inspection at the Former

Sandoval Zinc Smelter site. The investigation included the collection of soil, sediment, and waste samples throughout the area. During the expanded site inspection, 27 soil samples also were collected from residential properties in the City of Sandoval. These samples were collected from areas suspected of receiving contaminated cinder material from the Former Sandoval Zinc Smelter site. Significant levels of lead, zinc, and arsenic were found in soil samples from 16 residential yards. Besides the 16 properties sampled during the expanded site inspection, additional properties throughout the City of Sandoval are suspected of containing metals-contaminated process waste and cinders from the Former Sandoval Zinc Smelter site.

Based on the results of the expanded site inspection, IEPA requested assistance from the U.S. EPA to evaluate potential threats to human health, human welfare, and the environment posed by the spread of wastes from the Former Sandoval Zinc Smelter site onto nearby residential properties.

3. SITE ASSESSMENT ACTIVITIES

On August 23, 2010, U.S. EPA OSC Kevin Turner, IEPA member Dave Jansen, the U.S. EPA FIELDS Team, and WESTON START met at the City of Sandoval City Hall. OSC Turner had contacted the Mayor of Sandoval to secure a work area for mobile field office trailers. OSC Turner also secured access to 15 residential properties throughout the City of Sandoval.

The project objectives for the site assessment included the following:

- Identify the constituents and characteristic properties of surface and subsurface soils at residential properties throughout the City of Sandoval
- Determine if a removal action is warranted at any of the residential properties based on NCP criteria and, if so, whether the response should be classified as emergency, time-critical, or non-time-critical
- Rapidly assess and evaluate the urgency, magnitude, extent, and effects of a release or threatened release of hazardous substances, pollutants, or contaminants on human health and the environment
- Supply the Agency for Toxic Substances and Disease Registry (ATSDR) or others with information about the nature and magnitude of any health threats associated with the residential properties resulting from past operations at the Former Sandoval Zinc Smelter site
- Support subsequent public health advisories
- Determine a remedy to eliminate, reduce, or control Site-related risks to human health and the environment and to support an Action Memorandum documenting the identified removal approach

The XRF soil screening and soil sampling activities are discussed below.

3.1 XRF SOIL SCREENING ACTIVITIES

WESTON START conducted XRF field screening activities using an Innov-X (Serial No. 5491) XRF instrument. As directed by the OSC, WESTON START screened the following 15 properties in Sandoval using the XRF instrument:

- 203 South Mulberry
- 205 South Mulberry
- 210 South Mulberry
- 212 South Mulberry
- 201 South Clay
- 209 South Clay
- 406 South Clay
- 202 East Commercial
- 208 East Commercial
- 211 East Commercial
- 236 East Commercial
- 306 West Nebraska
- 504 West Virginia
- 113 North Railroad
- 701 North Vine

Figure 3-1 shows the sampling locations. The photographic log in **Appendix A** documents conditions at the time of the site assessment and soil screening activities.

WESTON START used a quadrant sampling scheme under which each residential property was divided into four distinct areas. Each area contained at least five XRF field screening locations. The location with the highest XRF field screening result was excavated using a shovel to 6 inches below ground surface (bgs) in order to field screen the subsurface. In some cases, residential properties were oriented in a way or possessed structures that did not allow the screening of four quadrants.

WESTON START also conducted XRF field screening of select public ROWs. U.S. EPA OSC Turner obtained anecdotal information from residents that the City of Sandoval often used cinders and slag residue from the Former Sandoval Zinc Smelter Site as roadbed and sidewalk fill prior to the placement of concrete and asphalt roadway surfacing materials. Ultimately, the U.S. EPA OSC eliminated ROW XRF field screening of City-owned or -controlled properties because the main focus of this site assessment was to determine if residential properties had been impacted by materials from the former smelter site.

3.2 SOIL SAMPLING ACTIVITIES

WESTON START collected representative soil grab samples from 6 of the 15 residential properties with the highest XRF field screening results. The table below lists the properties sampled and the sample identification (ID) numbers.

Property Address	Sample ID No.
212 South Mulberry	SZ-SO01-082410
202 East Commercial	SZ-SO02-082410
201 South Clay	SZ-SO03-082510
701 North Vine	SZ-SO04-082510
504 West Virginia	SZ-SO05-082510
236 East Commercial	SZ-SO06-082510

WESTON START donned fresh sampling gloves at each sampling location. Soil samples were collected using a decontaminated, stainless-steel trowel and placed in laboratory-provided containers. Each sample was labeled and immediately placed on ice after collection. The samples were delivered to the Applied Research & Development Laboratory in Mount Vernon, Illinois, for analysis. The samples were analyzed for Toxicity Characteristic Leaching Procedure (TCLP) metals and Resource Conservation and Recovery Act (RCRA) 8 Metals (plus zinc).

4. 4. XRF SCREENING AND SOIL SAMPLE ANALYTICAL RESULTS

WESTON START conducted XRF field screening at 15 residential properties and collected a total of six soil samples for laboratory analysis based on the XRF field screening results. **Figure 4-1** summarizes the soil sampling results. **Tables 4-1** and **4-2** summarize the XRF field screening and soil sample analytical results, respectively. **Appendix B** provides the laboratory analytical report and the data validation report for the samples.

The following cleanup objectives were used to evaluate the soil sample results:

- TCLP Metals: Title 40 of the *Code of Federal Regulations* (40 CFR), Part 261, Subpart C
- RCRA 8 Metals (plus Zinc): (1) U.S. EPA Regional Screening Levels (RSL) for Residential Soil and (2) IEPA Tiered Approach to Corrective Action Objectives (TACO) Tier I Residential Soil – Ingestion

The XRF screening and soil sample analytical results are discussed below.

4.1 XRF SCREENING RESULTS

The XRF screening results are summarized below for the surface and subsurface (6 inches bgs).

Table 4-1 summarizes the XRF screening results.

- 203 South Mulberry: XRF results ranged from 128 to 290 parts per million (ppm) in the surface and from 114 to 379 ppm in the subsurface.
- 205 South Mulberry: XRF results ranged from 126 to 647 ppm in the surface and from 579 to 712 ppm in the subsurface.
- 210 South Mulberry: XRF results ranged from 176 to 569 ppm in the surface and from 153 to 681 ppm in the subsurface.
- 212 South Mulberry: XRF results ranged from 416 to 2,017 ppm in the surface and from 302 to 1,104 ppm in the subsurface.
- 201 South Clay: XRF results ranged from 162 to 3,304 ppm in the surface and from 218 to 8,074 ppm in the subsurface.
- 209 South Clay: XRF results ranged from 91 to 1,370 ppm in the surface. No subsurface readings were taken per the request of the U.S. EPA OSC.

- 406 South Clay: XRF readings were all less than 50 ppm in the surface; therefore, no subsurface readings were taken.
- 202 East Commercial: XRF readings ranged from 2,821 to 5,382 ppm in the surface and from 2,578 to 16,719 ppm in the subsurface.
- 208 East Commercial: XRF readings ranged from 331 to 1,091 ppm in the surface and from 237 to 1,189 ppm in the subsurface.
- 211 East Commercial: XRF readings ranged from 369 to 898 ppm in the surface and from 319 to 1,056 ppm in the subsurface.
- 236 East Commercial: XRF readings ranged from 786 to 1,818 ppm in the surface and from 611 to 2,732 ppm in the subsurface.
- 306 West Nebraska: XRF readings ranged from 203 to 942 ppm in the surface. Only one subsurface reading was taken, and the result was 625 ppm.
- 504 West Virginia: XRF readings ranged from 305 to 10,448 ppm in the surface. Only one subsurface reading was taken, and the result was 4,154 ppm.
- 113 North Railroad: Because of the size of this property, only one surface reading and one subsurface reading were taken, and the results were 1,581 and 576 ppm, respectively.
- 701 North Vine: XRF readings ranged from 162 to 2,276 ppm in the surface. Only one subsurface reading was taken, and the result was 3,048 ppm.

4.2 SOIL SAMPLE ANALYTICAL RESULTS

Based on the highest XRF field screening results and as directed by the U.S. EPA OSC, WESTON START collected six soil samples for analysis for TCLP metals and RCRA 8 Metals (plus zinc). The soil sample analytical results are summarized below. **Figure 4-1** and **Table 4-2** summarize the soil sample analytical results.

- 212 South Mulberry (SZ-SO01-082410)
 - TCLP Metals: All results were below either the laboratory detection limits or the 40 CFR screening criteria.
 - RCRA 8 Metals (plus zinc): Arsenic was detected at 8.7 milligrams per kilogram (mg/kg). This result exceeds the U.S. EPA RSL. Lead was detected at 584 mg/kg. This result exceeds the IEPA TACO screening criterion. All other results were below the applicable screening criteria.

- 202 East Commercial (SZ-SO02-082410)
 - TCLP Metals: All results were below either the laboratory detection limits or the 40 CFR screening criteria.
 - RCRA 8 Metals (plus zinc): Arsenic was detected at 21.5 mg/kg, and lead was detected at 6,030 mg/kg. These results exceed both the U.S. EPA RSLs and the IEPA TACO screening criteria. All other results were below the applicable screening criteria.
- 201 South Clay (SZ-SO03-082510)
 - TCLP Metals: Lead was detected at 16.6 milligrams per liter (mg/L). This result exceeds the 40 CFR screening criterion. The sample was not analyzed for any other TCLP metals.
 - RCRA 8 Metals (plus zinc): Arsenic was detected at 32.9 mg/kg, and lead was detected at 6,510 mg/kg. These results exceed both the U.S. EPA RSLs and IEPA TACO screening criteria. All other results were below the applicable screening criteria.
- 701 North Vine (SZ-SO04-082510)
 - TCLP Metals: Lead was detected at 20.1 mg/L. This result exceeds the 40 CFR screening criterion. The sample was not analyzed for any other TCLP metals.
 - RCRA 8 Metals (plus zinc): Arsenic was detected at 10.5 mg/kg; lead was detected at 3,400 mg/kg; and zinc was detected at 27,000 mg/kg. These results all exceed the U.S. EPA RSLs, and the lead and zinc results also exceed the IEPA TACO screening criteria. All other results were below the applicable screening criteria.
- 504 West Virginia (SZ-SO05-082510)
 - TCLP Metals: Lead was detected at 7.2 mg/L. This result exceeds the 40 CFR screening criterion. All other results were below either the laboratory detection limits or the 40 CFR screening criteria.
 - RCRA 8 Metals (plus zinc): Arsenic was detected at 34.9 mg/kg, and lead was detected at 8,740 mg/kg. These results exceed both the U.S. EPA RSLs and the IEPA TACO screening criteria. All other results were below the applicable screening criteria.
- 236 East Commercial (SZ-SO06-082510)
 - TCLP Metals: Lead was detected at 53.1 mg/L. This result exceeds the 40 CFR screening criterion. The sample was not analyzed for any other TCLP metals.
 - RCRA 8 Metals (plus zinc): Arsenic was detected at 24.1 mg/kg, and lead was detected at 4,210 mg/kg. These results exceed both the U.S. EPA RSLs and the IEPA TACO screening criteria. All other results were below the applicable screening criteria.

During the site assessment, agricultural cropland production and private gardens were observed within or near known areas of contamination.

5. THREATS TO HUMAN HEALTH AND THE ENVIRONMENT

Factors to be considered in determining the appropriateness of a potential removal action at a Site are delineated in the NCP at 40 CFR 300.415(b)(2). A summary of the factors applicable to this Site is presented below.

- **Actual or potential exposure of nearby human populations, animals, or the food chain to hazardous substances, pollutants, or contaminants**

Waste cinders not used at the Former Sandoval Zinc Smelter site were placed into large piles and offered to the public and to the City of Sandoval for constructing and surfacing roadways, driveways, sidewalks, and parking lots or for general fill purposes. The distribution of the cinder material from the Former Sandoval Zinc Smelter site is random throughout the City of Sandoval.

During the site assessment, WESTON START used an XRF instrument to screen surface and subsurface soil at 15 residential properties. XRF surface results ranged from less than 50 to 10,448 ppm, and XRF subsurface results ranged from 114 to 16,719 ppm. Based on the highest XRF field screening results, WESTON START collected six soil samples from six residential properties for laboratory analysis. Soil sample results exceeded applicable screening criteria for TCLP lead (7.2 to 53.1 mg/L), arsenic (8.7 to 34.9 mg/kg), lead (584 to 8,740 mg/kg), and zinc (27,000 mg/kg).

Agricultural cropland production and private gardens were observed within or near known areas of contamination.

Exposure pathways consist of direct contact with impacted soil and inhalation of airborne dust. Because of the extensive distribution of wastes, exposure could occur from human activities and weather-influenced distribution, redistribution, and suspension of dust containing heavy metal contaminants. Examples of human activities that could result in exposure include children digging and playing in residential yards, public street construction and improvement projects, wintertime snow removal, residential storm ditch regrading, and new construction development of former residential properties and properties that lack adequate grass coverage of surface soil containing heavy metals. Furthermore, rain and wind could transport contaminants if human activities disturb soil before the rain and wind events.

- **Actual or potential contamination of drinking water supplies or sensitive ecosystems**

The City of Sandoval obtains drinking water from the Raccoon Lake Reservoir, which is located approximately 2 miles south of the City of Sandoval. Based on the distance of the city and the Site from this reservoir, it is unlikely that Site-related contaminants may have impacting drinking water supplies.

- **Weather conditions that may cause hazardous substances, pollutants, or contaminants to migrate or be released**

Sandoval receives an average yearly precipitation of 30.16 inches and an average yearly snowfall of 12.37 inches. In 2009, average temperatures ranged from 88 to 18 degrees Fahrenheit (°F).

Exposure pathways consist of direct contact with impacted soil and inhalation of airborne dust. Because of the extensive distribution of wastes, exposure could occur from human activities and weather-influenced distribution, redistribution, and suspension of dust containing heavy metal contaminants. Examples of human activities that could result in exposure include children digging and playing in residential yards, public street construction and improvement projects, wintertime snow removal, residential storm ditch regrading, and new construction development of former residential properties and properties that lack adequate grass coverage of surface soil containing heavy metals. Furthermore, rain and wind could transport contaminants if human activities disturb soil before the rain and wind events.

- **The availability of other appropriate federal or state response mechanisms to respond to the release**

IEPA requested assistance from the U.S. EPA to evaluate potential threats to human health, human welfare, and the environment posed by the spread of wastes from the Former Sandoval Zinc Smelter site onto nearby residential properties.

6. CONCLUSIONS

During the site assessment, WESTON START used an XRF instrument to screen surface and subsurface (0 to 6 inches bgs) soil at 15 residential properties as directed by the OSC. XRF surface results ranged from less than 50 to 10,448 ppm, and XRF subsurface results ranged from 114 to 16,719 ppm. Based on the highest XRF field screening results, WESTON START collected six soil samples for six residential properties for laboratory analysis. Soil sample results exceeded applicable screening criteria for TCLP lead (7.2 to 53.1 mg/L), arsenic (8.7 to 34.9 mg/kg), lead (584 to 8,740 mg/kg), and zinc (27,000 mg/kg).

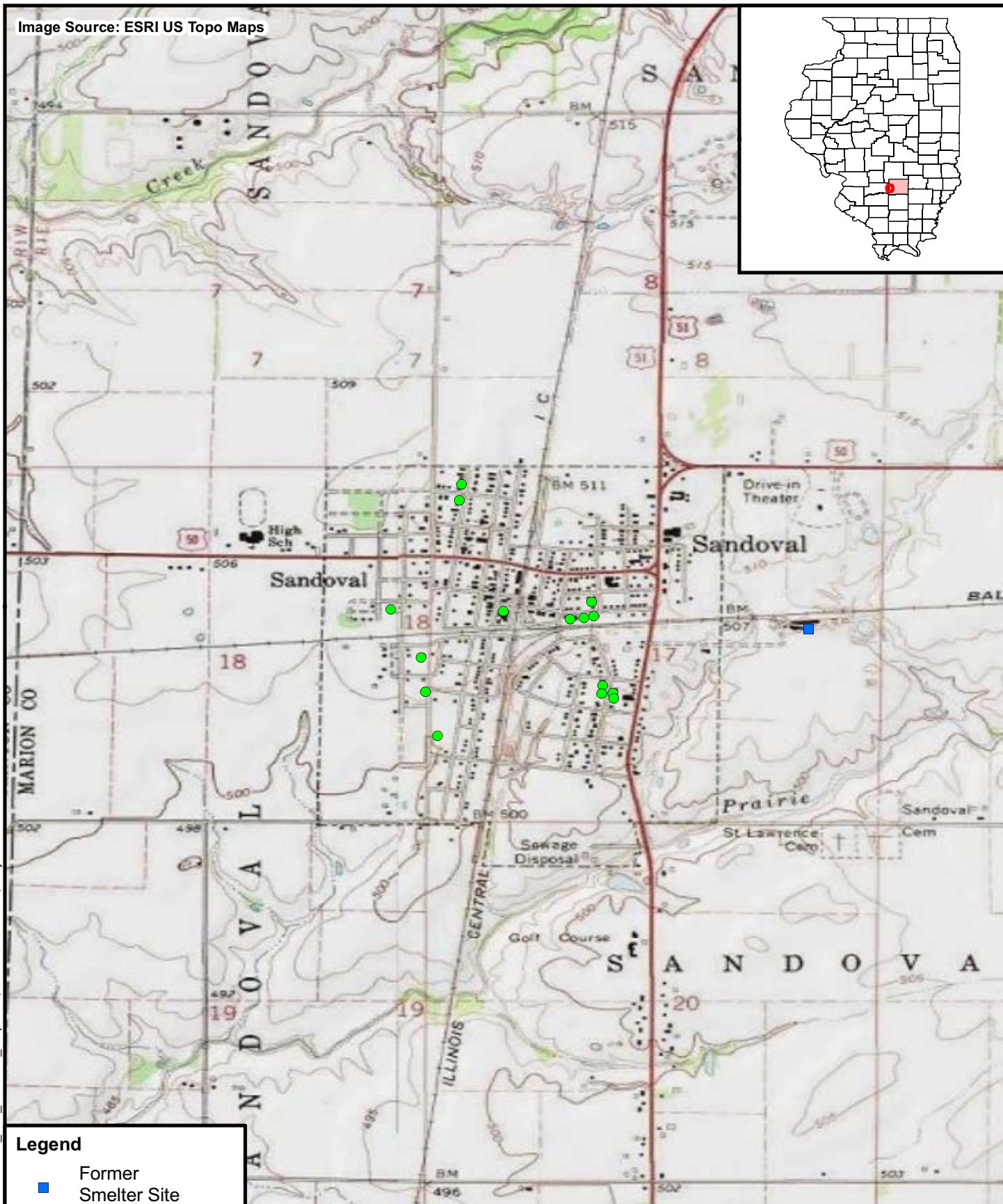
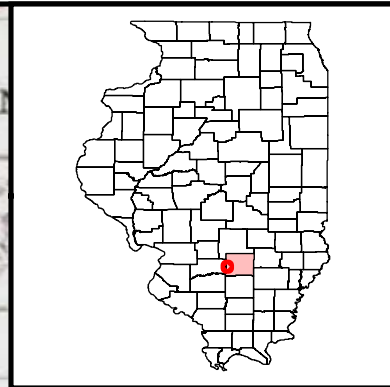
The soil sample results confirm the presence of zinc smelting process wastes and cinders from the Former Sandoval Zinc Smelter site and indicate highly leachable levels of lead. In addition, the soil sample results exceeded U.S. EPA RSLs and IEPA TACO screening criteria.

Exposure pathways consist of direct contact with impacted soil and inhalation of airborne dust. Because of the extensive distribution of wastes, exposure could occur from human activities and weather-influenced distribution, redistribution, and suspension of dust containing heavy metal contaminants. Examples of human activities that could result in exposure include children digging and playing in residential yards, public street construction and improvement projects, wintertime snow removal, residential storm ditch regrading, and new construction development of former residential properties and properties that lack adequate grass coverage of surface soil containing heavy metals. Furthermore, rain and wind could transport contaminants if human activities disturb soil before the rain and wind events.



Contaminants and conditions at the Site meet criteria established under the NCP for a removal action by the U.S. EPA. The removal action could be performed to mitigate imminent and substantial endangerment of human health, human welfare, and the environment posed by Site-related conditions.

FIGURES

Image Source: ESRI US Topo Maps



Legend

-  Former Smelter Site
-  Residential Sampling Locations

0 2,000
Feet



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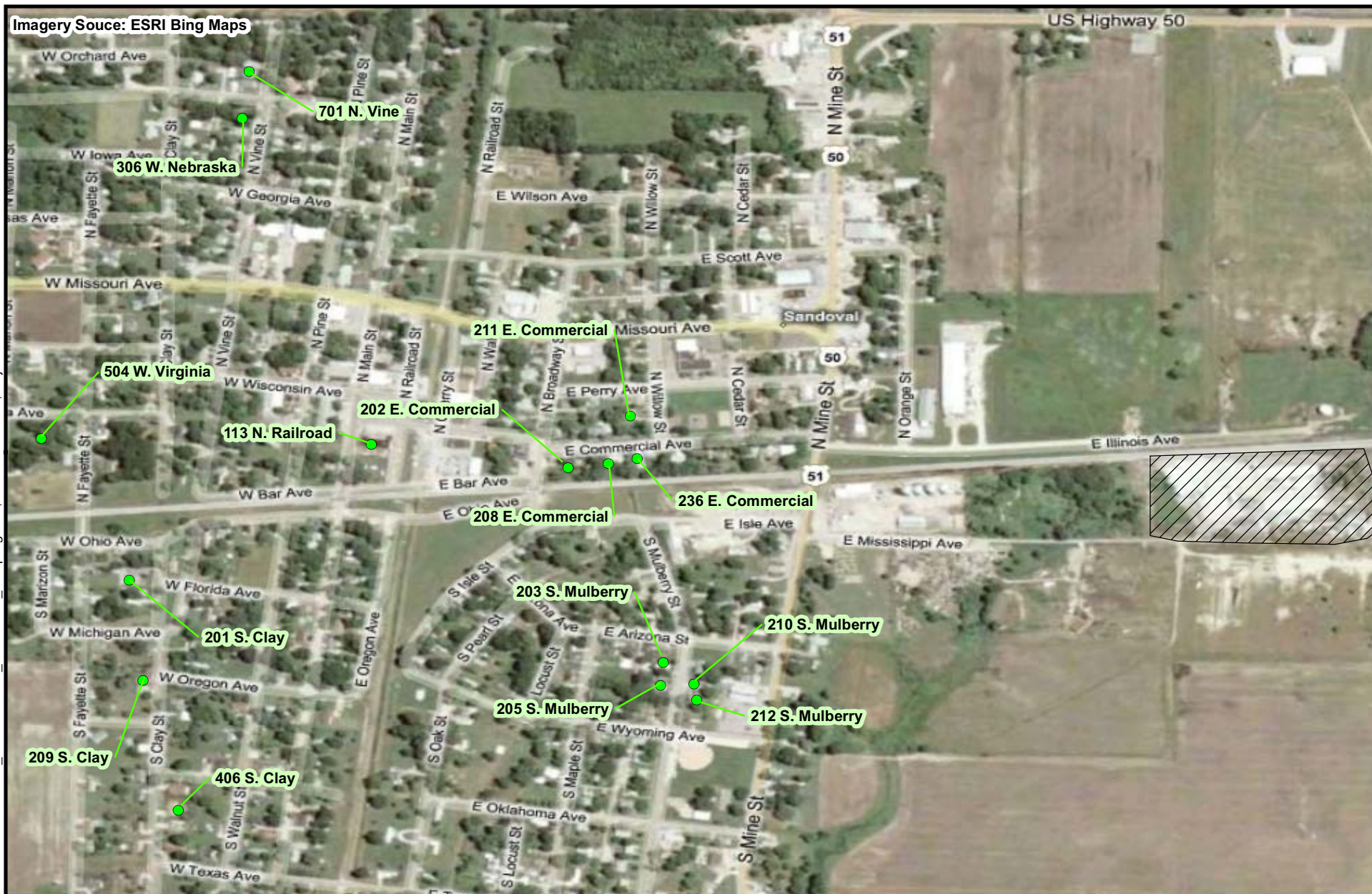
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

Prepared By:
WESTON SOLUTIONS, INC

750 E. Bunker Court
Suite 500
Vernon Hills, Illinois 60061

Figure 1-1
Site Location Map
Sandoval Zinc
Sandoval, Marion County, Illinois



Legend

-  Former Smelter
-  Residential Sampling Locations

0 700 Feet



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Prepared By:
WESTON SOLUTIONS
750 E. Bunker Court
Suite 500
Vernon Hills, Illinois 60061

Figure 3-1
Residential Sampling Location Map
Sandoval Zinc
Sandoval, Marion County, Illinois

File: D:\Sandoval_Zinc\mxd\F4-1_Lab_Results.mxd, 29-Dec-10 11:13, mejacm

Imagery Source: ESRI Bing Maps



Legend

Residential Sampling Locations Former Smelter

No sample collected for analysis

Sample collected for analysis

0 700 Feet

N

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WESTON SOLUTIONS, INC.
750 E Bunker Ct. Suite 500
Vernon Hills, Illinois 60061

Figure 4-1
Laboratory Sampling Results Map
Sandoval Zinc
Sandoval, Marion County, Illinois

TABLES

Table 4-1
XRF Screening Locations and Results
Sandoval Zinc Residential Site Assessment
Sandoval, Marion County, Illinois

Property Address	Quadrant No. (surface)	XRF Result (ppm)	Quadrant No. (6 inches bgs)	XRF Result (ppm)
203 South Mulberry	1	290	1	379
	2	172	2	124
	3	128	3	114
	4	Not screened because of property configuration		
205 South Mulberry	1	646	1	712
	2	647	2	579
	3	143	3	NS
	4	126	4	NS
210 South Mulberry	1	569	1	409
	2	533	2	681
	3	176	3	153
	4	214	4	169
212 South Mulberry	1	584	1	926
	2	2,017	2	1,104
	3	416	3	302
	4	527	4	380
201 South Clay	1	551	1	366
	2	1,744	2	3,282
	3	162	3	218
	4	3,304	4	8,074
209 South Clay	1	1,370	Not screened per request of U.S. EPA OSC	
	2	219		
	3	91		
	4	115		
406 South Clay	1	<50	Not screened because surface XRF results less than 50 ppm	
	2	<50		
	3	<50		
	4	<50		
202 East Commercial	1	2,821	1	16,719
	2	3,779	2	2,578
	3	5,382	3	6,497
	4	NS	4	NS
208 East Commercial	1	331	1	237
	2	1,091	2	1,189
	3	796	3	929
	4	574	4	663
211 East Commercial	1	898	1	1,056
	2	378	2	319
	3	369	3	405
	4	401	4	385
236 East Commercial	1	1,818	1	2,732
	2	1,450	2	1,670
	3	910	3	611
	4	786	4	1,248
306 West Nebraska	1	400	1	NS
	2	203	2	NS
	3	372	3	NS
	4	942	4	625
504 West Virginia	1	305	1	NS
	2	10,448	2	4,154
	3	Not screened because of size of property		
	4			

Table 4-1
XRF Screening Locations and Results
Sandoval Zinc Residential Site Assessment
Sandoval, Marion County, Illinois

Property Address	Quadrant No. (surface)	XRF Result (ppm)	Quadrant No. (6 inches bgs)	XRF Result (ppm)
113 North Railroad ^a	1	1,581	1	576
701 North Vine	1	162	1	NS
	2	241	2	NS
	3	282	3	NS
	4	2,276	4	3,048

Notes:

bgs = Below ground surface

NS = Not screened

OSC = On-Scene Coordinator

ppm = Part per million

U.S. EPA = United States Environmental Protection Agency

XRF = X-ray fluorescence

a Screened as one quadrant because of size of property

Table 4-2
Soil Sample Analytical Results
Sandoval Zinc Residential Site Assessment
Sandoval, Marion County, Illinois

Chemical Name	40 CFR ^a	U.S. EPA RSL ^b	IEPA TACO ^c	Location ID	SZ-SO01	SZ-SO02	SZ-SO03	SZ-SO04	SZ-SO05	SZ-SO06
				Field Sample ID	SZ-SO01-082410	SZ-SO02-082410	SZ-SO03-082510	SZ-SO04-082510	SZ-SO05-082510	SZ-SO06-082510
				Sampling Date	8/24/2010	8/24/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010
				Sampling Location	212 S. Mulberry	202 E. Commercial	201 S. Clay	701 N. Vine	504 W. Virginia	236 E. Commercial
				Unit						
TCLP Metals										
Arsenic	5	NL	NL	mg/L	ND	0.0091	NA	NA	ND	NA
Barium	100	NL	NL	mg/L	1.1	0.57	NA	NA	0.8	NA
Cadmium	1	NL	NL	mg/L	0.0068	0.02	NA	NA	0.034	NA
Chromium	5	NL	NL	mg/L	ND	0.0051	NA	NA	ND	NA
Lead	5	NL	NL	mg/L	0.089	4.8	16.6	20.1	7.2	53.1
Mercury	0.2	NL	NL	mg/L	ND	ND	NA	NA	ND	NA
Selenium	1	NL	NL	mg/L	ND	ND	NA	NA	ND	NA
Silver	5	NL	NL	mg/L	ND	ND	NA	NA	ND	NA
RCRA 8 Metals (plus Zinc)										
Arsenic	NL	0.39	11.3	mg/kg	8.7	21.5	32.9	10.5	34.9	24.1
Barium	NL	15,000	5,500	mg/kg	149	193	210	389	261	498
Cadmium	NL	70	78	mg/kg	0.85	2.1	2.7	3.9	4.8	4.3
Chromium	NL	120,000	230	mg/kg	13.7	14.1	11.6	20.8	14.9	15.3
Lead	NL	400	400	mg/kg	584	6,030	6,510	3,400	8,740	4,210
Mercury	NL	5.6	23	mg/kg	0.12	0.22	0.19	0.16	0.17	0.24
Selenium	NL	390	390	mg/kg	0.92	1.6	0.82	2	1.6	1.1
Silver	NL	390	390	mg/kg	0.69	1.6	2.6	1.2	4.9	2.1
Zinc	NL	23,000	23,000	mg/kg	1,520	6,210	10,700	27,000	19,300	13,400

Notes:

Result exceeds 40 CFR screening criterion.

Result exceeds U.S. EPA RSL screening criterion.

Result exceeds IEPA TACO screening criterion.

CFR = Code of Federal Regulations

ID = Identification

IEPA = Illinois Environmental Protection Agency

mg/kg = Milligram per kilogram

mg/L = Milligram per liter

NA = Not analyzed

ND = Not detected

a 40 CFR, Part 261

b U.S. EPA RSL - Residential Soil

c IEPA TACO Tier I Residential Soil - Ingestion

NL = Not listed

RCRA = Resource Conservation Recovery Act

RSL = Regional Screening Level

TACO = Tiered Approach to Corrective Action Objectives

TCLP = Toxicity Characteristic Leaching Procedure

U.S. EPA = United States Environmental Protection Agency

APPENDIX A

PHOTOGRAPHIC DOCUMENTATION



Site: Sandoval Zinc Residential

Photograph No.: 1

Direction: West

Subject: Northeast corner of XRF scanning grid layout with survey flags at 210 S. Mulberry

Date: 8/24/10

Photographer: Tom Binz



Site: Sandoval Zinc Residential

Photograph No.: 2

Direction: Northeast

Subject: Southeast corner of XRF scanning grid layout with survey flags at 210 S. Mulberry

Date: 8/24/10

Photographer: Tom Binz



Site: Sandoval Zinc Residential Site

Photograph No.: 3

Date: 8/24/10

Direction: East

Photographer: Tom Binz

Subject: Street-side view of XRF scanning grid layout, including ROW at 210 S. Mulberry



Site: Sandoval Zinc Residential Site

Photograph No.: 4

Date: 8/24/10

Direction: Northeast

Photographer: Tom Binz

Subject: Representative soil sample (SZ-SO01-082410) collection at 212 S. Mulberry

APPENDIX B
LABORATORY ANALYTICAL REPORT
AND DATA VALIDATION REPORT

ARDL REPORT NO: 301465
WESTON SOLUTIONS
PROJECT NAME: SANDOVAL ZINC S.A.

**SANDOVAL ZINC SITE
SANDOVAL, ILLINOIS
DATA VALIDATION REPORT**

Date: September 10, 2010

Laboratory: ARDL, Inc. (ARDL), Mount Vernon, Illinois

Laboratory Project #: 301465

Data Validation Performed By: Lisa Graczyk, Weston Solutions, Inc. (WESTON®) Superfund Technical Assessment and Response Team (START)

Weston Analytical Work Order #/TDD #: 20405.016.001.1028.00/S05-0001-1004-035

This data validation report has been prepared by WESTON START under the START III Region V contract. This report documents the data validation for 6 soil samples collected for the Sandoval Zinc Site that were analyzed for the following parameters and U.S. Environmental Protection Agency (U.S. EPA) methods:

- Total Metals by SW-846 Methods 6010B and 7470A
- Toxicity Characteristic Leaching Procedure (TCLP) Metals by SW-846 Methods 1311, 6010B, and 7470A

A level II data package was requested from ARDL. The data validation was conducted in general accordance with the U.S. EPA “Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review” dated January 2010. The Attachment contains the results summary sheets with the hand-written qualifiers applied during data validation.

**TOTAL METALS BY U.S. EPA SW-846 METHODS 6010B AND 7470A
TCLP METALS BY U.S. EPA SW-846 METHODS 1311, 6010B, AND 7470A**

1. Samples

The following table summarizes the samples for which this data validation is being conducted. Note that some samples were analyzed for TCLP lead only and not the full TCLP metal list (8 RCRA metals).

Samples	Lab ID	Date Collected	Date Analyzed
SZ-082410-SO-01	301465-01	8/24/2010	9/9/2010
SZ-082410-SO-02	301465-02	8/24/2010	9/9/2010
SZ-082410-SO-03	301465-03	8/24/2010	9/9/2010
SZ-082410-SO-04	301465-04	8/24/2010	9/9/2010
SZ-082410-SO-05	301465-05	8/24/2010	9/9/2010
SZ-082410-SO-06	301465-06	8/24/2010	9/9/2010

2. Holding Times

The samples were analyzed within the required holding time limit of 28 days from sample collection to analysis for mercury and 180 days from sample collection to analysis for all other metals.

3. Blank Results

Method blanks were analyzed with the metals analyses. The blanks were free of target metal contamination above the reporting limits except for as follows. Total zinc was detected above the reporting limit at 1.01 milligram per kilogram (mg/kg). TCLP lead was detected above the reporting limit at 0.0037 milligram per liter (mg/L). Because total zinc and TCLP lead was detected in the samples at much higher concentration than in the blanks, no qualifications were warranted.

4. Laboratory Control Sample (LCS) Results

The LCS recoveries were within the QC limits.

5. Matrix Spike (MS) and MS Duplicate (MSD) Results

ARDL analyzed an MS/MSD pair using a sample from the Sandoval Zinc Site. The percent recoveries and relative percent differences (RPD) were within the QC limits except for as follows.

For total lead and total zinc, the percent recoveries were high (above the QC limit). Because the spike amount was more than four times lower than the actual sample concentration, no qualifications are warranted.

6. Overall Assessment

The total and TCLP metals data are acceptable for use based on the information received.

Data Validation Report
Sandoval Zinc Site
ARDL, Inc.
Laboratory Project #: 301465

ATTACHMENT

ARDL, INC. RESULTS SUMMARY

ARDL REPORT NO: 301465
WESTON SOLUTIONS
PROJECT NAME: SANDOVAL ZINC S.A.

INORGANIC ANALYSIS DATA PACKAGE

WESTON SOLUTIONS

Report Date: 09/10/10

Lab Name: ARDL, Inc.
Samples Received at ARDL: 26-Aug-10
Project Name: Sandoval Zinc S.A.

ARDL Report No.: 301465

CASE NARRATIVE

Sample ID No.	Date Collected	Lab ID No.	Analysis Requested
SZ-082410-SO-01	08/24/10	301465-01	Total Metals(1), TCLP Lead, Total Solids
SZ-082410-SO-02	08/24/10	301465-02	Total Metals(1), TCLP Metals(2), Total Solids
SZ-082510-SO-03	08/25/10	301465-03	Total Metals(1), TCLP Lead, Total Solids
SZ-082510-SO-04	08/25/10	301465-04	Total Metals(1), TCLP Lead, Total Solids
SZ-082510-SO-05	08/25/10	301465-05	Total Metals(1), TCLP Metals(2), Total Solids
SZ-082510-SO-06	08/25/10	301465-06	Total Metals(1), TCLP Lead, Total Solids

(1) Including arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver and zinc.

(2) Including arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver.

NOTE: Sample results for TCLP arsenic, barium, cadmium, chromium, selenium and silver were reported for ARDL sample number 301465-01 for QC purposes only.

The quality control data are summarized as follows:

LABORATORY CONTROL SAMPLES

Percent recovery of all LCS analyses were within control limits.

PREPARATION BLANKS

Results of all preparation blanks except TCLP lead and total zinc were within acceptable limits. The sample results for TCLP lead and total zinc were greater than 20X the preparation blank results. Therefore, all TCLP lead and total zinc results have been reported herein as valid.

MATRIX SPIKES

Percent recovery of all matrix spikes and matrix spike duplicates except 1 of 2 for total lead and zinc were within control limits. The sample results for total lead and zinc were greater than 4 times the spike amount; therefore, percent recovery was not considered.

DUPLICATES

RPD on all duplicate analyses were within control limits.

All duplicate analyses are reported as MS/MSD except total solids which is reported as sample/duplicate.

Release of the data contained in this package has been authorized by the Technical Services Manager or his designee as verified by the following signature.



Dean S. Dickerson
Technical Services Manager

**CHAIN-OF-CUSTODY
DOCUMENTATION**

ARDL, Inc.

P.O. Box 1566, 400 Aviation Drive, Mt. Vernon, IL 62864
(618) 244-3235 Phone (618) 244-1149 Fax

CHAIN OF CUSTODY RECORD

PROJECT
SANDOVAL ZINC S.A.

USEPA R5 / WESTON SOLUTIONS

SAMPLERS: (Signature)

Tom Binz *Thomas Binz*

SAMPLE NUMBER

DATE

TIME

COMP

GRAB

NO. OF CONTAINERS

Totals RCR 8

Totals RCR 8

Totals RCR 8

Totals RCR 8

Totals RCR 8

Totals RCR 8

Totals RCR 8

Totals RCR 8

Totals RCR 8

Totals RCR 8

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Totals RCR 8

Totals RCR 8

Totals RCR 8

Totals RCR 8

Totals RCR 8

Totals RCR 8

Totals RCR 8

Totals RCR 8

Relinquished by: (Signature)

Thomas Binz

Date

08/26/10

Time

1044

Received by: (Signature)

Kevin Turner

Date

8-26-10

Time

1220

Shipping Ticket No.

REMARKS/SPECIAL INSTRUCTIONS:

Please Contact Lisa Grayczk or

Tom Binz 314-581-0975

w/ Questions

COPIES: White & Yellow copies accompany sample shipment to laboratory.
Pink copy retained by sampler.

PURCHASE ORDER NO:

301465

**SAMPLE RESULTS
QUALITY ASSURANCE DATA**

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
Project No: USEPA R5

Analysis: Inorganics
NELAC Certified

Field ID: SZ-082410-SO-01
Sampling Loc'n: SANDOVAL ZINC SA
Sampling Date: 08/24/2010
Sampling Time: 0858

ARDL No: 301465-01
Received: 08/26/2010
Matrix: SOIL
Moisture: 13.9

Analyte	Detection Limit	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Arsenic	0.35	8.7	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Arsenic, TCLP	0.0030	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Barium	1.2	149	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Barium, TCLP	0.010	1.1	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Cadmium	0.23	0.85	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Cadmium, TCLP	0.0020	0.0068	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Chromium	0.58	13.7	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Chromium, TCLP	0.0050	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Lead	0.35	584	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead, TCLP	0.0030	0.089	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Mercury	0.089	0.12	MG/KG	7470A	7470A	09/08/10	09/08/10	C1865
Selenium	0.58	0.92	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Selenium, TCLP	0.0050	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Silver	0.58	0.69	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Silver, TCLP	0.0050	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Zinc	0.58	1520	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Solids, Percent	1.0	86.1	%	NONE	160.3	NA	08/26/10	09074450

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
Project No: USEPA R5

Analysis: Inorganics
NELAC Certified

Field ID: SZ-082410-SO-02
Sampling Loc'n: SANDOVAL ZINC SA
Sampling Date: 08/24/2010
Sampling Time: 1338

ARDL No: 301465-02
Received: 08/26/2010
Matrix: SOIL
Moisture: 20.3

Analyte	Detection Limit	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Arsenic	0.38	21.5	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Arsenic, TCLP	0.0030	0.0091	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Barium	1.3	193	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Barium, TCLP	0.010	0.57	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Cadmium	0.25	2.1	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Cadmium, TCLP	0.0020	0.02	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Chromium	0.63	14.1	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Chromium, TCLP	0.0050	0.0051	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Lead	0.38	6030	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead, TCLP	0.0030	4.8	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Mercury	0.095	0.22	MG/KG	7470A	7470A	09/08/10	09/08/10	C1865
Mercury, TCLP	0.00020	ND	MG/L	7470A	7470A	09/08/10	09/08/10	C1866
Selenium	0.63	1.6	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Selenium, TCLP	0.0050	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Silver	0.63	1.6	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Silver, TCLP	0.0050	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Zinc	12.5	6210	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Solids, Percent	1.0	79.7	%	NONE	160.3	NA	08/26/10	09074450

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
Project No: USEPA R5

Analysis: Inorganics
NELAC Certified

Field ID: SZ-082510-SO-03
Sampling Loc'n: SANDOVAL ZINC SA
Sampling Date: 08/25/2010
Sampling Time: 0931

ARDL No: 301465-03
Received: 08/26/2010
Matrix: SOIL
Moisture: 19.8

Analyte	Detection		Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
	Limit	Result						
Arsenic	0.37	32.9	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Barium	1.2	210	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Cadmium	0.25	2.7	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Chromium	0.62	11.6	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead	0.37	6510	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead, TCLP	0.0030	16.6	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Mercury	0.092	0.19	MG/KG	7470A	7470A	09/08/10	09/08/10	C1865
Selenium	0.62	0.82	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Silver	0.62	2.6	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Zinc	12.5	10700	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Solids, Percent	1.0	80.2	%	NONE	160.3	NA	08/26/10	09074450

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Mt. Vernon, Illinois 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
Project No: USEPA R5

Analysis: Inorganics
NELAC Certified

Field ID: SZ-082510-SO-04
Sampling Loc'n: SANDOVAL ZINC SA
Sampling Date: 08/25/2010
Sampling Time: 1054

ARDL No: 301465-04
Received: 08/26/2010
Matrix: SOIL
Moisture: 19

Analyte	Detection Limit	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Arsenic	0.37	10.5	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Barium	1.2	389	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Cadmium	0.25	3.9	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Chromium	0.62	20.8	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead	0.37	3400	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead, TCLP	0.0030	20.1	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Mercury	0.094	0.16	MG/KG	7470A	7470A	09/08/10	09/08/10	C1865
Selenium	0.62	2	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Silver	0.62	1.2	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Zinc	12.3	27000	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Solids, Percent	1.0	81.0	%	NONE	160.3	NA	08/26/10	09074450

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
Project No: USEPA R5

Analysis: Inorganics
NELAC Certified

Field ID: SZ-082510-SO-05
Sampling Loc'n: SANDOVAL ZINC SA
Sampling Date: 08/25/2010
Sampling Time: 1446

ARDL No: 301465-05
Received: 08/26/2010
Matrix: SOIL
Moisture: 18.9

Analyte	Detection Limit	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Arsenic	0.37	34.9	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Arsenic, TCLP	0.0030	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Barium	1.2	261	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Barium, TCLP	0.010	0.8	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Cadmium	0.25	4.8	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Cadmium, TCLP	0.0020	0.034	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Chromium	0.62	14.9	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Chromium, TCLP	0.0050	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Lead	0.37	8740	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead, TCLP	0.0030	7.2	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Mercury	0.098	0.17	MG/KG	7470A	7470A	09/08/10	09/08/10	C1865
Mercury, TCLP	0.00020	ND	MG/L	7470A	7470A	09/08/10	09/08/10	C1866
Selenium	0.62	1.6	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Selenium, TCLP	0.0050	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Silver	0.62	4.9	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Silver, TCLP	0.0050	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Zinc	12.3	19300	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Solids, Percent	1.0	81.1	%	NONE	160.3	NA	08/26/10	09074450

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
Project No: USEPA R5

Analysis: Inorganics
NELAC Certified

Field ID: SZ-082510-SO-06
Sampling Loc'n: SANDOVAL ZINC SA
Sampling Date: 08/25/2010
Sampling Time: 1625

ARDL No: 301465-06
Received: 08/26/2010
Matrix: SOIL
Moisture: 13.8

Analyte	Detection		Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
	Limit	Result						
Arsenic	0.35	24.1	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Barium	1.2	498	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Cadmium	0.23	4.3	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Chromium	0.58	15.3	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead	0.35	4210	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead, TCLP	0.0030	53.1	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Mercury	0.092	0.24	MG/KG	7470A	7470A	09/08/10	09/08/10	C1865
Selenium	0.58	1.1	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Silver	0.58	2.1	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Zinc	11.6	13400	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Solids, Percent	1.0	86.2	%	NONE	160.3	NA	08/26/10	09074450

MATRIX SPIKE/SPIKE DUPLICATE REPORT
ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
 Project No.: USEPA R5

NELAC Certified

Analyte	Sample Matrix	Sample Result	MS Result	MS Level	MS % Rec	MSD Result	MSD Level	MSD % Rec	% Rec Limits	RPD	RPD Limit	Run	QC Lab Number
Arsenic	SOIL	8.7	221	232	91	226	232	94	75-125	3	20	P4507	301465-01MS
Arsenic, TCLP	SOIL	ND	4.95	5	99	4.75	5	95	75-125	4	20	P4506	301465-01MS
Barium	SOIL	149	379	232	99	381	232	100	75-125	0	20	P4507	301465-01MS
Barium, TCLP	SOIL	1.1	87.6	100	87	85.4	100	84	75-125	3	20	P4506	301465-01MS
Cadmium	SOIL	0.85	7.44	5.81	114	7.6	5.81	116	75-125	2	20	P4507	301465-01MS
Cadmium, TCLP	SOIL	0.0068	0.886	1	88	0.904	1	90	75-125	2	20	P4506	301465-01MS
Chromium	SOIL	13.7	36.1	23.2	97	38.1	23.2	105	75-125	5	20	P4507	301465-01MS
Chromium, TCLP	SOIL	ND	4.24	5	85	4.04	5	81	75-125	5	20	P4506	301465-01MS
Lead	SOIL	584	632	58.1	83	741	58.1	271 *	75-125	16	20	P4507	301465-01MS
Lead, TCLP	SOIL	0.089	4.16	5	81	4.03	5	79	75-125	3	20	P4506	301465-01MS
Mercury	SOIL	0.24	0.704	0.46	101	0.655	0.451	92	75-125	7	20	C1865	301465-06MS
Mercury, TCLP	SOIL	ND	0.00469	0.00525	89	0.00468	0.00525	89	75-125	0	20	C1866	301465-02MS
Selenium	SOIL	0.92	219	232	94	224	232	96	75-125	2	20	P4507	301465-01MS
Selenium, TCLP	SOIL	ND	0.917	1	92	0.892	1	89	75-125	3	20	P4506	301465-01MS
Silver	SOIL	0.69	6.16	5.81	94	5.98	5.81	91	75-125	3	20	P4507	301465-01MS
Silver, TCLP	SOIL	ND	4.69	5	94	4.57	5	91	75-125	3	20	P4506	301465-01MS
Zinc	SOIL	1520	1710	116	166 *	1650	116	112	75-125	4	20	P4507	301465-01MS

NOTE: Any values tabulated above marked with an asterisk are outside of acceptable limits.

SAMPLE DUPLICATE REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name:	SANDOVAL ZINC SA						NELAC Certified	
Project No.:	USEPA R5							
Analyte	Sample Conc'n	First Duplicate	Second Duplicate	Units	Percent Diff	Mean (Smp,D1,D2)	Analytical Run	QC Lab Number
Solids, Percent	86.1	84.8	--	%	2	--	09074450	301465-01D1

BLANK SUMMARY REPORT
 ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
 Project No.: USEPA R5

NELAC Certified

Analyte	Detect Limit	Blank Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run	QC Lab Number
Arsenic	0.3	ND	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507	301465-01B1
Arsenic, TCLP	0.003	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506	301465-01B1
Barium	1	ND	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507	301465-01B1
Barium, TCLP	0.01	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506	301465-01B1
Cadmium	0.2	ND	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507	301465-01B1
Cadmium, TCLP	0.002	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506	301465-01B1
Chromium	0.5	ND	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507	301465-01B1
Chromium, TCLP	0.005	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506	301465-01B1
Lead	0.3	ND	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507	301465-01B1
Lead, TCLP	0.003	0.0037	MG/L	3010A	6010B	09/07/10	09/09/10	P4506	301465-01B1
Mercury	0.08	ND	MG/KG	7470A	7470A	09/08/10	09/08/10	C1865	301464-01B1
Mercury, TCLP	0.0002	ND	MG/L	7470A	7470A	09/08/10	09/08/10	C1866	301464-01B1
Selenium	0.5	ND	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507	301465-01B1
Selenium, TCLP	0.005	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506	301465-01B1
Silver	0.5	ND	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507	301465-01B1
Silver, TCLP	0.005	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506	301465-01B1
Zinc	0.5	1.01	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507	301465-01B1
Solids, Percent	1	ND	%	NONE	160.3	NA	08/26/10	09074450	301464-01B1

LABORATORY CONTROL SAMPLE REPORT
 ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
 Project No.: USEPA R5

NELAC Certified

Analyte	LCS 1 Result	LCS 1 Level	LCS 1 % Rec	LCS 2 Result	LCS 2 Level	LCS 2 % Rec	% Rec Limits	Mean % Rec	Analytical Run	QC Lab Number
Arsenic	0.981	1	98	--	--	--	80-120	--	P4507	301465-01C1
Arsenic, TCLP	0.975	1	97	--	--	--	80-120	--	P4506	301465-01C1
Barium	9.59	10	96	--	--	--	80-120	--	P4507	301465-01C1
Barium, TCLP	9.27	10	93	--	--	--	80-120	--	P4506	301465-01C1
Cadmium	0.477	0.5	95	--	--	--	80-120	--	P4507	301465-01C1
Cadmium, TCLP	0.473	0.5	95	--	--	--	80-120	--	P4506	301465-01C1
Chromium	0.475	0.5	95	--	--	--	80-120	--	P4507	301465-01C1
Chromium, TCLP	0.448	0.5	90	--	--	--	80-120	--	P4506	301465-01C1
Lead	0.432	0.5	86	--	--	--	80-120	--	P4507	301465-01C1
Lead, TCLP	0.436	0.5	87	--	--	--	80-120	--	P4506	301465-01C1
Mercury	0.00507	0.005	101	--	--	--	80-120	--	C1865	301464-01C1
Mercury, TCLP	0.00481	0.005	96	--	--	--	80-120	--	C1866	301464-01C1
Selenium	0.485	0.5	97	--	--	--	80-120	--	P4507	301465-01C1
Selenium, TCLP	0.488	0.5	98	--	--	--	80-120	--	P4506	301465-01C1
Silver	0.479	0.5	96	--	--	--	80-120	--	P4507	301465-01C1
Silver, TCLP	0.472	0.5	94	--	--	--	80-120	--	P4506	301465-01C1
Zinc	0.921	1	92	--	--	--	80-120	--	P4507	301465-01C1

NOTE: Any values tabulated above marked with an asterisk are outside of acceptable limits.

INORGANIC ANALYSIS DATA PACKAGE

WESTON SOLUTIONS

Report Date: 09/10/10

Lab Name: ARDL, Inc.
Samples Received at ARDL: 26-Aug-10
Project Name: Sandoval Zinc S.A.

ARDL Report No.: 301465

CASE NARRATIVE

Sample ID No.	Date Collected	Lab ID No.	Analysis Requested
SZ-082410-SO-01	08/24/10	301465-01	Total Metals(1), TCLP Lead, Total Solids
SZ-082410-SO-02	08/24/10	301465-02	Total Metals(1), TCLP Metals(2), Total Solids
SZ-082510-SO-03	08/25/10	301465-03	Total Metals(1), TCLP Lead, Total Solids
SZ-082510-SO-04	08/25/10	301465-04	Total Metals(1), TCLP Lead, Total Solids
SZ-082510-SO-05	08/25/10	301465-05	Total Metals(1), TCLP Metals(2), Total Solids
SZ-082510-SO-06	08/25/10	301465-06	Total Metals(1), TCLP Lead, Total Solids

(1) Including arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver and zinc.

(2) Including arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver.

NOTE: Sample results for TCLP arsenic, barium, cadmium, chromium, selenium and silver were reported for ARDL sample number 301465-01 for QC purposes only.

The quality control data are summarized as follows:

LABORATORY CONTROL SAMPLES

Percent recovery of all LCS analyses were within control limits.

PREPARATION BLANKS

Results of all preparation blanks except TCLP lead and total zinc were within acceptable limits. The sample results for TCLP lead and total zinc were greater than 20X the preparation blank results. Therefore, all TCLP lead and total zinc results have been reported herein as valid.

MATRIX SPIKES

Percent recovery of all matrix spikes and matrix spike duplicates except 1 of 2 for total lead and zinc were within control limits. The sample results for total lead and zinc were greater than 4 times the spike amount; therefore, percent recovery was not considered.

DUPLICATES

RPD on all duplicate analyses were within control limits.

All duplicate analyses are reported as MS/MSD except total solids which is reported as sample/duplicate.

Release of the data contained in this package has been authorized by the Technical Services Manager or his designee as verified by the following signature.



Dean S. Dickerson
Technical Services Manager

**CHAIN-OF-CUSTODY
DOCUMENTATION**

ARDL, Inc.

P.O. Box 1566, 400 Aviation Drive, Mt. Vernon, IL 62864
(618) 244-3235 Phone (618) 244-1149 Fax

CHAIN OF CUSTODY RECORD

301465

PROJECT
SANDOVAL ZINC S.A.

USEPA R5 / WESTON SOLUTIONS

SAMPLERS: (Signature)

Tom Binz *Tom Binz*

SAMPLE NUMBER

DATE

TIME

COMP

GRAB

NO. OF CONTAINERS

Totals RCR 8

Totals RCR 8

Totals RCR 8

Totals RCR 8

Totals RCR 8

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Totals RCR 8

Relinquished by: (Signature)

Tom Binz

Date

08/26/10

Time

1044

Received by: (Signature)

Kevin Turner

Date

8-26-10

Time

1220

Relinquished by: (Signature)

Tom Binz

Date

08/26/10

Time

1044

Received by: (Signature)

Kevin Turner

Date

8-26-10

Time

1220

REMARKS/SPECIAL INSTRUCTIONS:

Please Contact Lisa Grayczk or

Tom Binz 314-581-0975

w/ Questions

COPIES: White & Yellow copies accompany sample shipment to laboratory.
Pink copy retained by sampler.

PURCHASE ORDER NO:

**SAMPLE RESULTS
QUALITY ASSURANCE DATA**

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
Project No: USEPA R5

Analysis: Inorganics
NELAC Certified

Field ID: SZ-082410-SO-01
Sampling Loc'n: SANDOVAL ZINC SA
Sampling Date: 08/24/2010
Sampling Time: 0858

ARDL No: 301465-01
Received: 08/26/2010
Matrix: SOIL
Moisture: 13.9

Analyte	Detection Limit	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Arsenic	0.35	8.7	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Arsenic, TCLP	0.0030	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Barium	1.2	149	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Barium, TCLP	0.010	1.1	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Cadmium	0.23	0.85	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Cadmium, TCLP	0.0020	0.0068	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Chromium	0.58	13.7	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Chromium, TCLP	0.0050	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Lead	0.35	584	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead, TCLP	0.0030	0.089	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Mercury	0.089	0.12	MG/KG	7470A	7470A	09/08/10	09/08/10	C1865
Selenium	0.58	0.92	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Selenium, TCLP	0.0050	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Silver	0.58	0.69	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Silver, TCLP	0.0050	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Zinc	0.58	1520	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Solids, Percent	1.0	86.1	%	NONE	160.3	NA	08/26/10	09074450

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
Project No: USEPA R5

Analysis: Inorganics
NELAC Certified

Field ID: SZ-082410-SO-02
Sampling Loc'n: SANDOVAL ZINC SA
Sampling Date: 08/24/2010
Sampling Time: 1338

ARDL No: 301465-02
Received: 08/26/2010
Matrix: SOIL
Moisture: 20.3

Analyte	Detection Limit	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Arsenic	0.38	21.5	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Arsenic, TCLP	0.0030	0.0091	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Barium	1.3	193	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Barium, TCLP	0.010	0.57	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Cadmium	0.25	2.1	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Cadmium, TCLP	0.0020	0.02	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Chromium	0.63	14.1	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Chromium, TCLP	0.0050	0.0051	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Lead	0.38	6030	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead, TCLP	0.0030	4.8	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Mercury	0.095	0.22	MG/KG	7470A	7470A	09/08/10	09/08/10	C1865
Mercury, TCLP	0.00020	ND	MG/L	7470A	7470A	09/08/10	09/08/10	C1866
Selenium	0.63	1.6	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Selenium, TCLP	0.0050	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Silver	0.63	1.6	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Silver, TCLP	0.0050	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Zinc	12.5	6210	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Solids, Percent	1.0	79.7	%	NONE	160.3	NA	08/26/10	09074450

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
Project No: USEPA R5

Analysis: Inorganics
NELAC Certified

Field ID: SZ-082510-SO-03
Sampling Loc'n: SANDOVAL ZINC SA
Sampling Date: 08/25/2010
Sampling Time: 0931

ARDL No: 301465-03
Received: 08/26/2010
Matrix: SOIL
Moisture: 19.8

Analyte	Detection		Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
	Limit	Result						
Arsenic	0.37	32.9	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Barium	1.2	210	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Cadmium	0.25	2.7	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Chromium	0.62	11.6	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead	0.37	6510	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead, TCLP	0.0030	16.6	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Mercury	0.092	0.19	MG/KG	7470A	7470A	09/08/10	09/08/10	C1865
Selenium	0.62	0.82	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Silver	0.62	2.6	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Zinc	12.5	10700	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Solids, Percent	1.0	80.2	%	NONE	160.3	NA	08/26/10	09074450

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
Project No: USEPA R5

Analysis: Inorganics
NELAC Certified

Field ID: SZ-082510-SO-04
Sampling Loc'n: SANDOVAL ZINC SA
Sampling Date: 08/25/2010
Sampling Time: 1054

ARDL No: 301465-04
Received: 08/26/2010
Matrix: SOIL
Moisture: 19

Analyte	Detection Limit	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Arsenic	0.37	10.5	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Barium	1.2	389	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Cadmium	0.25	3.9	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Chromium	0.62	20.8	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead	0.37	3400	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead, TCLP	0.0030	20.1	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Mercury	0.094	0.16	MG/KG	7470A	7470A	09/08/10	09/08/10	C1865
Selenium	0.62	2	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Silver	0.62	1.2	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Zinc	12.3	27000	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Solids, Percent	1.0	81.0	%	NONE	160.3	NA	08/26/10	09074450

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
Project No: USEPA R5

Analysis: Inorganics
NELAC Certified

Field ID: SZ-082510-SO-05
Sampling Loc'n: SANDOVAL ZINC SA
Sampling Date: 08/25/2010
Sampling Time: 1446

ARDL No: 301465-05
Received: 08/26/2010
Matrix: SOIL
Moisture: 18.9

Analyte	Detection Limit	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Arsenic	0.37	34.9	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Arsenic, TCLP	0.0030	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Barium	1.2	261	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Barium, TCLP	0.010	0.8	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Cadmium	0.25	4.8	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Cadmium, TCLP	0.0020	0.034	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Chromium	0.62	14.9	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Chromium, TCLP	0.0050	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Lead	0.37	8740	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead, TCLP	0.0030	7.2	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Mercury	0.098	0.17	MG/KG	7470A	7470A	09/08/10	09/08/10	C1865
Mercury, TCLP	0.00020	ND	MG/L	7470A	7470A	09/08/10	09/08/10	C1866
Selenium	0.62	1.6	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Selenium, TCLP	0.0050	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Silver	0.62	4.9	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Silver, TCLP	0.0050	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Zinc	12.3	19300	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Solids, Percent	1.0	81.1	%	NONE	160.3	NA	08/26/10	09074450

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
Project No: USEPA R5

Analysis: Inorganics
NELAC Certified

Field ID: SZ-082510-SO-06
Sampling Loc'n: SANDOVAL ZINC SA
Sampling Date: 08/25/2010
Sampling Time: 1625

ARDL No: 301465-06
Received: 08/26/2010
Matrix: SOIL
Moisture: 13.8

Analyte	Detection		Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
	Limit	Result						
Arsenic	0.35	24.1	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Barium	1.2	498	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Cadmium	0.23	4.3	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Chromium	0.58	15.3	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead	0.35	4210	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Lead, TCLP	0.0030	53.1	MG/L	3010A	6010B	09/07/10	09/09/10	P4506
Mercury	0.092	0.24	MG/KG	7470A	7470A	09/08/10	09/08/10	C1865
Selenium	0.58	1.1	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Silver	0.58	2.1	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Zinc	11.6	13400	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507
Solids, Percent	1.0	86.2	%	NONE	160.3	NA	08/26/10	09074450

MATRIX SPIKE/SPIKE DUPLICATE REPORT
ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
 Project No.: USEPA R5

NELAC Certified

Analyte	Sample Matrix	Sample Result	MS Result	MS Level	MS % Rec	MSD Result	MSD Level	MSD % Rec	% Rec Limits	RPD	RPD Limit	Run	QC Lab Number
Arsenic	SOIL	8.7	221	232	91	226	232	94	75-125	3	20	P4507	301465-01MS
Arsenic, TCLP	SOIL	ND	4.95	5	99	4.75	5	95	75-125	4	20	P4506	301465-01MS
Barium	SOIL	149	379	232	99	381	232	100	75-125	0	20	P4507	301465-01MS
Barium, TCLP	SOIL	1.1	87.6	100	87	85.4	100	84	75-125	3	20	P4506	301465-01MS
Cadmium	SOIL	0.85	7.44	5.81	114	7.6	5.81	116	75-125	2	20	P4507	301465-01MS
Cadmium, TCLP	SOIL	0.0068	0.886	1	88	0.904	1	90	75-125	2	20	P4506	301465-01MS
Chromium	SOIL	13.7	36.1	23.2	97	38.1	23.2	105	75-125	5	20	P4507	301465-01MS
Chromium, TCLP	SOIL	ND	4.24	5	85	4.04	5	81	75-125	5	20	P4506	301465-01MS
Lead	SOIL	584	632	58.1	83	741	58.1	271 *	75-125	16	20	P4507	301465-01MS
Lead, TCLP	SOIL	0.089	4.16	5	81	4.03	5	79	75-125	3	20	P4506	301465-01MS
Mercury	SOIL	0.24	0.704	0.46	101	0.655	0.451	92	75-125	7	20	C1865	301465-06MS
Mercury, TCLP	SOIL	ND	0.00469	0.00525	89	0.00468	0.00525	89	75-125	0	20	C1866	301465-02MS
Selenium	SOIL	0.92	219	232	94	224	232	96	75-125	2	20	P4507	301465-01MS
Selenium, TCLP	SOIL	ND	0.917	1	92	0.892	1	89	75-125	3	20	P4506	301465-01MS
Silver	SOIL	0.69	6.16	5.81	94	5.98	5.81	91	75-125	3	20	P4507	301465-01MS
Silver, TCLP	SOIL	ND	4.69	5	94	4.57	5	91	75-125	3	20	P4506	301465-01MS
Zinc	SOIL	1520	1710	116	166 *	1650	116	112	75-125	4	20	P4507	301465-01MS

NOTE: Any values tabulated above marked with an asterisk are outside of acceptable limits.

SAMPLE DUPLICATE REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name:	SANDOVAL ZINC SA						NELAC Certified	
Project No.:	USEPA R5							
Analyte	Sample Conc'n	First Duplicate	Second Duplicate	Units	Percent Diff	Mean (Smp,D1,D2)	Analytical Run	QC Lab Number
Solids, Percent	86.1	84.8	--	%	2	--	09074450	301465-01D1

BLANK SUMMARY REPORT
 ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
 Project No.: USEPA R5

NELAC Certified

Analyte	Detect Limit	Blank Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run	QC Lab Number
Arsenic	0.3	ND	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507	301465-01B1
Arsenic, TCLP	0.003	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506	301465-01B1
Barium	1	ND	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507	301465-01B1
Barium, TCLP	0.01	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506	301465-01B1
Cadmium	0.2	ND	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507	301465-01B1
Cadmium, TCLP	0.002	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506	301465-01B1
Chromium	0.5	ND	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507	301465-01B1
Chromium, TCLP	0.005	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506	301465-01B1
Lead	0.3	ND	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507	301465-01B1
Lead, TCLP	0.003	0.0037	MG/L	3010A	6010B	09/07/10	09/09/10	P4506	301465-01B1
Mercury	0.08	ND	MG/KG	7470A	7470A	09/08/10	09/08/10	C1865	301464-01B1
Mercury, TCLP	0.0002	ND	MG/L	7470A	7470A	09/08/10	09/08/10	C1866	301464-01B1
Selenium	0.5	ND	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507	301465-01B1
Selenium, TCLP	0.005	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506	301465-01B1
Silver	0.5	ND	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507	301465-01B1
Silver, TCLP	0.005	ND	MG/L	3010A	6010B	09/07/10	09/09/10	P4506	301465-01B1
Zinc	0.5	1.01	MG/KG	3050B	6010B	09/02/10	09/09/10	P4507	301465-01B1
Solids, Percent	1	ND	%	NONE	160.3	NA	08/26/10	09074450	301464-01B1

LABORATORY CONTROL SAMPLE REPORT
 ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 301465

Report Date: 09/10/2010

Project Name: SANDOVAL ZINC SA
 Project No.: USEPA R5

NELAC Certified

Analyte	LCS 1 Result	LCS 1 Level	LCS 1 % Rec	LCS 2 Result	LCS 2 Level	LCS 2 % Rec	% Rec Limits	Mean % Rec	Analytical Run	QC Lab Number
Arsenic	0.981	1	98	--	--	--	80-120	--	P4507	301465-01C1
Arsenic, TCLP	0.975	1	97	--	--	--	80-120	--	P4506	301465-01C1
Barium	9.59	10	96	--	--	--	80-120	--	P4507	301465-01C1
Barium, TCLP	9.27	10	93	--	--	--	80-120	--	P4506	301465-01C1
Cadmium	0.477	0.5	95	--	--	--	80-120	--	P4507	301465-01C1
Cadmium, TCLP	0.473	0.5	95	--	--	--	80-120	--	P4506	301465-01C1
Chromium	0.475	0.5	95	--	--	--	80-120	--	P4507	301465-01C1
Chromium, TCLP	0.448	0.5	90	--	--	--	80-120	--	P4506	301465-01C1
Lead	0.432	0.5	86	--	--	--	80-120	--	P4507	301465-01C1
Lead, TCLP	0.436	0.5	87	--	--	--	80-120	--	P4506	301465-01C1
Mercury	0.00507	0.005	101	--	--	--	80-120	--	C1865	301464-01C1
Mercury, TCLP	0.00481	0.005	96	--	--	--	80-120	--	C1866	301464-01C1
Selenium	0.485	0.5	97	--	--	--	80-120	--	P4507	301465-01C1
Selenium, TCLP	0.488	0.5	98	--	--	--	80-120	--	P4506	301465-01C1
Silver	0.479	0.5	96	--	--	--	80-120	--	P4507	301465-01C1
Silver, TCLP	0.472	0.5	94	--	--	--	80-120	--	P4506	301465-01C1
Zinc	0.921	1	92	--	--	--	80-120	--	P4507	301465-01C1

NOTE: Any values tabulated above marked with an asterisk are outside of acceptable limits.